

Streptococcus Pneumoniae

(Invasive Pneumococcal Disease)

DISEASE REPORTABLE WITHIN 24 HOURS OF DIAGNOSIS

Per N.J.A.C. 8:57, healthcare providers and administrators shall report by mail or by electronic reporting within 24 hours of diagnosis, confirmed cases of invasive pneumococcal disease to the health officer of the jurisdiction where the ill or infected person lives, or if unknown, wherein the diagnosis is made. A directory of local health departments in New Jersey is available at

<http://www.state.nj.us/health/lh/directory/lhdselectcounty.shtml>.

If the health officer is unavailable, the healthcare provider or administrator shall make the report to the Department by telephone to 609.588.7500, between 8:00 A.M. and 5:00 P.M. on non-holiday weekdays or to 609.392.2020 during all other days and hours.



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1 THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Pneumococcal diseases are infections caused by the gram-positive bacteria *Streptococcus pneumoniae*. The most common types of infections caused by these bacteria include middle ear infections (otitis media), pneumonia, blood stream infections (bacteremia), sinus infections, and meningitis. There are more than 90 known serotypes of *S. pneumoniae*. The ten most common serotypes are responsible for approximately 60% of all invasive disease cases worldwide. The prevalence of any one serotype varies by age group and geographic region.

B. Clinical Description

S. pneumoniae is normally found in the nasopharynx of 5% to 10% of healthy adults and 20% to 40% of healthy children. It can be found in higher amounts in certain environments, especially those where people are spending a great deal of time in close and crowded conditions (e.g., army barracks, prisons, homeless shelters, daycare). Once the organism has colonized an adult, it is likely to persist for two to four weeks but may persist for as long as six months without causing illness.

Invasive pneumococcal disease most commonly occurs in young children, the elderly, or people with serious underlying medical conditions, such as chronic lung, heart, or kidney disease. Others at risk include people with alcoholism, diabetes, sickle cell anemia, or other immunocompromising conditions (e.g., HIV/AIDS, asplenia). Symptoms may include fever, chills, headache, ear pain, cough, chest pain, disorientation, shortness of breath, and occasionally stiff neck.

1. Adults

Pneumococcal pneumonia is the most common clinical presentation of invasive pneumococcal disease among adults. Symptoms include chills, productive cough, shortness of breath, rapid heart rate, rapid breathing, poor oxygenation, malaise, and weakness. Nausea, vomiting, and headache occur less frequently. **Pneumococcal bacteremia** occurs in about 25% to 30% of patients with pneumococcal pneumonia. **Pneumococcal meningitis**

accounts for 13% to 19% of all cases of invasive *S. pneumoniae*. One quarter of these patients also have pneumonia. Symptoms include headache, lethargy, vomiting, irritability, fever, stiff neck, seizures, and coma. The mortality rate of pneumococcal meningitis is 30% but may be as high as 80% in elderly persons. Neurologic sequelae are common among survivors.

2. Children

Pneumococcal bacteremia without a known site of infection is the most common invasive clinical presentation among children younger than two years of age, accounting for approximately 70% of invasive disease in this age group. **Pneumococcal pneumonia** accounts for 12% to 16% of invasive pneumococcal disease among children two years of age and younger. *S. pneumoniae* is also a common cause of acute otitis media and is detected in 28% to 55% of middle ear aspirates. By age 12 months, more than 60% of children have had at least one episode of acute otitis media. Complications of pneumococcal otitis media may include mastoiditis and **pneumococcal meningitis**.

C. Reservoirs

The reservoir for *S. pneumoniae* is the nasopharynx of asymptomatic human carriers.

D. Modes of Transmission

The bacteria are spread through contact with persons who are ill or who carry the bacteria in their nasopharynx. Transmission is mostly through the spread of respiratory droplets from the nose or mouth of a person with a pneumococcal infection. It is common for people, especially children, to carry the bacteria in their throats without becoming ill from it. The spread of the organism within a family or household is influenced by such factors as crowding, season, and the presence of upper respiratory infection or pneumococcal infections.

E. Incubation Period

The incubation period of pneumococcal infections can vary but is generally from one to three days.

F. Period of Communicability or Infectious Period

The period of communicability for pneumococcal disease is unknown, but presumably transmission can occur as long as the organism appears in respiratory secretions.

G. Epidemiology

Pneumococcal infections are more common during the winter and in early spring when respiratory diseases are more prevalent. The incidence of the pneumococcal bacteremia is relatively high among infants up to two years of age and low among teenagers and young adults. Rates of disease begin to increase again around age 55. Certain populations such as

Native Americans, Native Alaskans, and African Americans appear to be especially susceptible to invasive pneumococcal disease for reasons that are unclear.

The overall incidence of invasive pneumococcal disease in the United States in 1998–99 (before licensure of pneumococcal conjugate vaccine) was estimated to be approximately 24 cases per 100,000 population. The highest rates occur in children younger than two years (188 per 100,000). Incidence is low for persons five to 17 years of age and increases to 61 per 100,000 population in persons 65 years and older. The rate of invasive disease for children younger than two years has declined by 70% to 80% since the introduction of the pneumococcal conjugate vaccine. A slightly more modest decline has occurred in older age groups as well; however, this is probably related to the reduction in transmission from vaccinated children to household and other close contacts.

Resistance to penicillin and other antibiotics is common. In 1997, penicillin resistance ranged from 15% to 40% in seven Centers for Disease Control and Prevention (CDC) Emerging Infections Program sites. The percentage of resistance varies by geographic region.

2 CASE DEFINITION

A. New Jersey Department of Health and Senior Services (NJDHSS) Case Definition

CONFIRMED

Clinically compatible case, AND

Isolation of *S. pneumoniae* from normally sterile site (e.g., blood, cerebrospinal fluid, or, less commonly, joint, pleural, or pericardial fluid).

PROBABLE

Not used.

POSSIBLE

Not used.

B. Difference from CDC Case Definition

S. pneumoniae, drug-resistant invasive disease, is on CDC's nationally notifiable disease list. NJDHSS uses the same CDC case definition but the drug-resistant component of the definition has been removed.

3 LABORATORY TESTING AVAILABLE

A definitive diagnosis of infection with *S. pneumoniae* generally relies on isolation of the organism from blood, cerebrospinal fluid, or other normally sterile body sites. A Gram stain revealing gram-positive lancet-shaped diplococci can be suggestive of pneumococcal infection. Most hospital- and commercial-based laboratories can identify the presence of *S. pneumoniae*. In special situations, testing can be performed to determine the serotype of the organism. Serotyping of isolates of *S. pneumoniae* can be performed at CDC and will be requested for outbreak situations only.

Resistance to penicillin and other antibiotics is common. Antibiotic sensitivity testing is often performed to determine if resistance has developed.

4 PURPOSE OF SURVEILLANCE AND REPORTING AND REPORTING REQUIREMENTS

A. Purpose of Surveillance and Reporting

- To identify where invasive pneumococcal disease occurs in New Jersey.
- To recognize areas in New Jersey where invasive pneumococcal disease incidence has changed (increased or decreased).
- To identify potential outbreak situations.
- To focus preventive education.

B. Laboratory Reporting Requirements

The New Jersey Administrative Code (NJAC 8:57-1.6) stipulates that laboratories report (by telephone, by confidential fax, or over the Internet using the Communicable Disease Reporting and Surveillance System [CDRSS]) all cases of pneumococcal disease to the local health officer having jurisdiction over the locality in which the patient lives or, if unknown, to the health officer in whose jurisdiction the healthcare provider requesting the laboratory examination is located. The report shall contain, at a minimum, the reporting laboratory's name, address, and telephone number; the age, date of birth, gender, race, ethnicity, home address, and telephone number of the person tested; the test performed; the date of testing; the test results; and the healthcare provider's name and address.

C. Healthcare Provider Reporting Requirements

The New Jersey Administrative Code (NJAC 8:57-1.4) stipulates that healthcare providers report (by telephone, by confidential fax, or in writing) all cases of pneumococcal disease to the local health officer having jurisdiction over the locality in which the patient lives or, if unknown, to the health officer in whose jurisdiction the healthcare provider requesting the

laboratory examination is located. The report shall contain the name of the disease; date of illness onset; and name, age, date of birth, race, ethnicity, home address, and telephone number of the person they are reporting. Additionally, name, address, institution, telephone number of reporting official, and other information as may be required by NJDHSS concerning a specific disease should be reported.

D. Health Officer Reporting and Follow-Up Responsibilities

The New Jersey Administrative Code (NJAC 8:57-1.7) stipulates that each local health officer must report the occurrence of any case of pneumococcal disease within 24 hours of receiving the report. A written or electronic copy should be sent to the NJDHSS Infectious and Zoonotic Diseases Program (IZDP).

5 CASE INVESTIGATION

A. Forms

It is requested that the local health officer complete a CDS-1 reporting form by interviewing the patient and others who may be able to provide pertinent information. Much of the information required on the form can be obtained from the patient's healthcare provider or the medical record.

B. Entry into CDRSS

The mandatory fields in CDRSS include: disease, last name, county, municipality, gender, race, ethnicity, case status, report status.

The following table can be used as a quick reference guide to determine which CDRSS fields need to be completed for accurate and complete reporting of *Streptococcus pneumoniae* cases. The "Tab" column includes the tabs which appear along the top of the CDRSS screen. The "Required Information" column provides detailed explanations of what data should be entered.

CDRSS Screen	Required Information
Patient Info	Enter the disease name ("STREPTOCOCCUS PNEUMONIAE") patient demographic information, illness onset date, and the date the case was reported to the local health department (LHD). There are no subgroups for <i>S. pneumoniae</i> .

CDRSS Screen	Required Information
Addresses	Enter any alternate address (e.g., a daycare address). Use the Comments section in this screen to record any pertinent information about the alternate address (e.g., the times per week the case-patient attends daycare). Entering an alternate address will allow other disease investigators access to the case if the alternate address falls within their jurisdiction.
Clinical Status	Enter any treatment that the patient received and record the names of the medical facilities and physician(s) involved in the patient's care. If the patient received care from two or more hospitals, be sure that all are entered so the case can be accessed by all infection control professionals (ICPs) covering these facilities. If immunization status is known, it should also be entered here. If the patient died, date of death should be recorded under the Mortality section.
Signs/Symptoms	Check appropriate boxes for signs and symptoms and indicate their onset. Make every effort to get complete information by interviewing the physician, family members, ICP, or others who might have knowledge of the patient's illness. Also, information regarding the resolution of signs and symptoms should be entered.
Risk Factors	Enter complete information about risk factors to facilitate study of pneumococcal disease in New Jersey.
Laboratory Eval	Select "CULTURE FOR STREPTOCOCCUS PNEUMONIAE" if culture of a normally sterile site (e.g., blood, cerebrospinal fluid) was performed. Select "STREPTOCOCCUS PNEUMONIAE ANTIGEN" if an antigen test was performed. NOTE: Antigen testing is not adequate for case confirmation (see case definition in Section 2). Specimen type, specimen collection date, test result, and, if applicable, test value should also be recorded. Antimicrobial susceptibility testing results should be documented in the Comments section.
Contact Tracing	Information regarding contacts is not required for this disease.

CDRSS Screen	Required Information
Case Comments	<p>Enter general comments (i.e., information that is not discretely captured by a specific topic screen or drop-down menu) in the Comments section. NOTE: Select pieces of information entered in the Comments section CANNOT be automatically exported when generating reports. Therefore, whenever possible, record information about the case in the fields that have been designated to capture this information; information included in these fields CAN be automatically exported when generating reports.</p>
Epidemiology	<p>Under the Other Control Measures section, indicate if the patient falls into any of the categories listed under Patient Role(s)/Function(s) (e.g., “DAYCARE ATTENDEE,” “DAYCARE PROVIDER”). Record name of and contact information for case investigators from other agencies (e.g., CDC, out-of-state health departments). Document communication between investigators in the Comments section.</p>
Case Classification Report Status	<p>Case status options are: “REPORT UNDER INVESTIGATION (RUI),” “CONFIRMED,” “PROBABLE,” “POSSIBLE,” and “NOT A CASE.”</p> <ul style="list-style-type: none"> • All cases entered by laboratories (including LabCorp electronic submissions) should be assigned a case status of “REPORT UNDER INVESTIGATION (RUI).” • Cases still under investigation by the LHD should be assigned a case status of “REPORT UNDER INVESTIGATION (RUI).” • Upon completion of the investigation, the LHD should assign a case status on the basis of the case definition. “CONFIRMED” and “NOT A CASE” are the only appropriate options for classifying a case of <i>S. pneumoniae</i> (see section 2A). <p>Report status options are: “PENDING,” “LHD OPEN,” “LHD REVIEW,” “LHD CLOSED,” “DELETE,” “REOPENED,” “DHSS OPEN,” “DHSS REVIEW,” and “DHSS APPROVED.”</p> <ul style="list-style-type: none"> • Cases reported by laboratories (including LabCorp electronic submissions) should be assigned a report status of “PENDING.” • Once the LHD begins investigating a case, the report status should be changed to “LHD OPEN.” • The “LHD REVIEW” option can be used if the LHD has a person who reviews the case before it is closed (e.g., health

CDRSS Screen	Required Information
	<p>officer or director of nursing).</p> <ul style="list-style-type: none"> Once the LHD investigation is complete and all the data are entered into CDRSS, the LHD should change the report status to “LHD CLOSED.” “LHD CLOSED” cases will be reviewed by DHSS and be assigned one of the DHSS-specific report status categories. If additional information is needed on a particular case, the report status will be changed to “REOPENED” and the LHD will be notified by e-mail. Cases that are “DHSS APPROVED” cannot be edited by LHD staff (see Section C below). <p>If a case is inappropriately entered (e.g., a case of Group A Streptococcus was erroneously entered as a case of <i>S. pneumoniae</i>) the case should be assigned a report status of “DELETE.” A report status of “DELETE” should NOT be used if a reported case of <i>S. pneumoniae</i> simply does not meet case definition. Rather, it should be assigned the appropriate case status, as described above.</p>

C. Other Reporting/Investigation Issues

1. Case report forms (CDS-1 and labs) DO NOT need to be mailed to NJDHSS as long as mandatory fields indicated in section B are completed.
2. Once LHD completes its investigation and assigns a report status of “LHD CLOSED,” NJDHSS will review the case. NJDHSS will approve the case by changing the report status to “DHSS APPROVED.” At this time, the case will be submitted to CDC and the case will be locked for editing. If additional information is received after a case has been placed in “DHSS APPROVED,” you will need to contact NJDHSS to reopen the case. This should be done only if the additional information changes the case status of the report.
3. Every effort should be made to complete the investigation within three months of opening a case. Cases that remain open for three months or more and have no investigation or update notes will be closed by NJDHSS and marked as not a case.

6 CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements (NJAC 8:57-1.10)

None.

B. Protection of Contacts of a Case

Although the pneumococcal bacterium is easy to transmit, contact with a person diagnosed with a pneumococcal infection does not require antibiotic prophylaxis.

C. Managing Special Situations

1. Daycare

Although the pneumococcal bacterium is easy to transmit, contact with a child with pneumococcal infection does not pose a higher risk of infection than does normal day-to-day contact with healthy children. Children who come in contact with a child diagnosed with a pneumococcal infection do not require antibiotic prophylaxis. The daycare facility should be provided with information regarding hand hygiene and environmental sanitation.

2. Residential Living Facility

If the number of reported cases in a residential living facility is higher than usual, please contact the NJDHSS IZDP as soon as possible at 609.588.7500. This situation may warrant an investigation of clustered cases to determine a course of action to prevent further cases.

D. Preventive Measures

1. Chemoprophylaxis

Antibiotic chemoprophylaxis of contacts is not recommended.

2. Vaccination

There are two different vaccines: one primarily for adults and one for infants and preschool-aged children. The vaccine for adults has been available since 1983 and is called the pneumococcal polysaccharide vaccine (Pneumovax). This vaccine contains serotypes 1, 2, 3, 4, 5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 12F, 14, 15B, 17F, 18C, 19F, 19A, 20, 22F, 23F, and 33F, which account for 88% of bacteremic pneumococcal disease. The vaccine is recommended for all adults 65 years and older and children older than two years with underlying medical conditions (diabetes, heart or lung disease, asplenia, HIV, or other immunocompromising conditions).

The pediatric vaccine is called the pneumococcal conjugate vaccine (Prevnar). The vaccine contains serotypes 4, 9V, 14, 19F, 23F, 18C, and 6B, which account for 86% of bacteremia, 83% of meningitis, and 65% of otitis media among children younger than six years (United States 1978–1994). This vaccine was licensed in 2000 for use in children younger than five years. The vaccine is currently recommended for use in children younger than 24 months and any child younger than 59 months with high-risk medical conditions.

Additional Information

Additional information can also be found on the CDC Web site at http://www.cdc.gov/ncidod/dbmd/diseaseinfo/streppneum_a.htm.

References

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